PSYCHE

VOL. XX. APRIL, 1913. No. 2

A SYNOPSIS OF THE SAPROMYZIDAE.[1]

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In the Genera Insectorum, Fascicle 68 (1908), Friedrich Hendel has given an excellent review of the group Lauxaniinæ, generally known to American entomologists as the Sapromyzidæ. As this work has introduced several changes in nomenclature differing from the list of species as given in Aldrich's Catalogue, and as there has appeard no complete review of the North American species, the following synopsis is offered. It may seem presumptuous to publish this review, based as it is mainly on descriptions, for I have in all but eighty species of the family in my collection for reference, but the value of working tables in assisting future students is obvious enough to excuse its appearance in print.

Naturally, the attempt to visualize a species from a brief description alone does not assure the most satisfactory results, so that the following tables give largely an artificial classification. Such attempts at reconstructing a mind-picture of the species have proved especially unsatisfactory in the big group *Lauxania*, where the assignment of the species to *Minettia* or to *Sapromyza* has sometimes been merely a guess.

I am indebted to my colleague and neighbor, Professor J. M. Aldrich, for the inspiration that prompted this review and for his material assistance in sharing his library and collection during its progress. His collection has extended the distribution of many species, and in the following pages the localities of his species are added with the designation "Aldrich." Those localities marked with the asterisk (*) are represented in my collection.

The North American species of *Sapromyza* have been twice tabulated. In 1892 Mr. C. H. Tyler Townsend published a "Preliminary Grouping of *Sapromyza*" in the Canadian Entomologist, pages 301 to 304. The next year appeared "El Género *Sapro-*

[1] Contribution from the Zoölogical Laboratory of the State College of Washington.

myza en América" by Felix Lynch Arribalzaga, in the Anales de la Sociedad Científica Argentina, xxxiv., pages 253 to 301.

The subgenus *Sapromyza* is our dominant group. The species may sometimes be difficult to place correctly in a tabulation since their yellow color may change at death. Where confusion was most obvious the species have been several times included in the key. Spottings of the abdominal segments may become vague through a darkening of the general color. Again, there is some variation in the extent of color markings; as, for example, *univittata*, *aveola*, and *vinnula*, probably varieties of a single species, show gradations in the extent of the mesonotal stripe, etc. *Flavipennis* Fabricius, with bare arista, is not the same species as *flavipennis* described by Wiedemann, although Wiedemann's specimens came from Fabricius' collection.

The following description of a new genus of Sciomyzidæ is included in this paper, since it deals with a species hitherto classed as a *Sapromyza*.

=Poecilographa see p. 203

PŒCILOMYIA: A NEW GENUS OF SCIOMYZIDÆ. (Figs. 1 and 2.)

In a note in connection with the original description of *Sapromyza decora*, Loew stated that the shape of the head and particularly of the antennæ was very much like that of certain Tetanoceras, in view of which the species should be separated from *Sapromyza* as a distinct genus. Not recalling this note when studying specimens of *decora* I came independently to the same conclusion, and coincidentally received a letter from Mr. C. W. Johnson conveying the same suggestion.

Decora is an unusually distinct species, with its reticulate wings and maculate body. It clearly is not a Sapromyzine because of the following array of characters. These characters are invariably, or at least usually, associated with the Tetanocerine Sciomyzidæ and are not at all, or at most very rarely, found in the Sapromyzidæ.

Front broadly convex, the periorbits separated from the unusually broad, shining, central part by a strong suture; face strongly concave, the oral margin projecting, but the clypeus (Chitinhufeisen) rudimentary; cheeks nearly as deep as the eye-height; postvertical bristles divergent; second antennal joint elongate and bristly; the third joint triangular, pointed, excised above; palpi long and linear; thorax with a fine scabrous coating; prothoracic, mesopleural, and sterno-pleural bristles all wanting; front femora without a series of bristles on posterior flexor edge; middle tibiæ without preapical spur but with apical crown of bristles; wings with complete anal vein.

The species is therefore certainly to be excluded from the Sapromyzidæ, and as there is no genus in the Sciomyzidæ to receive it, I would propose for it the new generic name *Pœcilomyia*.

A further characterization presents the following:

Head in profile a little higher than broad, the upper portion spherical; periorbits less than one-fourth the width of the interfrontalia (Mittelleiste), separated from it by well-marked sutures which are parallel with the eye-margin on the front, but converge at the vertex to meet the sutures of the epicephalon (cerebrale) of the occiput. The interfrontalia is uniformly convex, glabrous, and highly polished, is darker than the silky periorbits, and is marked with a translucent median stripe extending forward from the anterior ocellus. The arms of the frontal suture (Stirnspaltenäste) continue weakly to the lower edge of the eye, but at the usual antennal dark spot they send a suture across to the eye thus dividing the frontal from the facial orbits (Wangendreieck). The lunula is completely covered. The face (Gesichtsleiste) narrow but widening below, at its middle no wider than the sides (Wangen), in profile considerably concave, with oral margin projecting. Clypeus (Schlundgerüst) entirely undeveloped. Palpi linear, porrect, extending beyond oral margin, hairy beneath. Cheeks (Backen) one-half the eye-height, hairy, rounding into the sides of the face (ohne Vibrisseneck). Paracephala (Hinterhauptsorbiten) loosely setose; a closely setulose patch above the neck. Eyes rounded, but obliquely longer than wide. First joint of antennæ small, nearly bare, immersed in its socket; second joint conical, with the upper inner side projecting most, the outer side about one-half the length of the third joint, the inner side subequal to this joint, setose, except the outside, and with three long bristles on the upper edge; third joint pointed, somewhat excised above, uniformly fine-hairy; the dark arista rather loosely and evenly plumose above and below; the whole antenna no longer than eye-breadth, with the arista shorter than the last two joints. The bristles of the head are long and strong and include: a pair of diverging postverticals, a convergent inner and a divergent outer vertical, 2 reclinate frontoorbitals and a stout pair of proclinate ocellar bristles. The lesser ocellars are very small. The orbital bristles arise from dark-colored papillæ. The chætotaxy of the thorax is as follows: 1 humeral, 0 posthumeral, 2 notopleural, 1 presutural, 3 dorsocentral, 1 pair prescutellar, 2 pair convergent scutellar, 1 supraalar, and 2 approximate postalar bristles; no prothoracic or pleural bristles, except a couple (Vallarborsten) on the pteropleural ridge just under the calypter. Meso-, ptero-, and sternopleuræ with scattered fine hairs, the last with a bristle in the angle below. Calypteres pale yellow, with pale fringe. Front femora with several bristles in extensor row, hind femora ♂ biseriately spinose beneath; front and hind tibiæ with preapical bristle, middle tibiæ with usual ending of bristles. Last two segments of abdomen with long submarginal bristles; hypopygium globose. Wings reticulate with alternating light and dark spots, costal margin unbroken; first vein ending midway between tip of auxiliary vein and the anterior cross vein; veins not sinuate, third and fourth veins subparallel; anal vein complete.

Type: *Sapromyza decora* Loew.

Of the eighteen genera of Sciomyzidæ before me the new genus

bears most resemblance to *Trypetoptera* Hendel, but presents these differences: first vein ending far before the anterior cross vein; meso- and pteropleuræ with very fine hairs which are scarcely bristle-like; second antennal joint obconical and not rounded; calypteres pale; fronto-orbital sutures distinct, in *Trypetoptera* the periorbits are not differentiated; three dorsocentral bristles.

None of the other genera, except *Coremacera* Rondani, have the periorbits so definitely separated from the interfrontalia. The presence of three dorsocentrals and of a convex and broad middle portion of the front are unusual characters in the Sciomyzidæ.

Table of Genera.

1. Tibiae with evident preapical bristle; two fronto-orbital bristles; postvertical bristles convergent; ovipositor not specialized, with two small lamellæ (Subfamily Lauxaniinæ) 2
   Tibiæ without preapical bristle; front with only the upper orbital bristle; postvertical bristles divergent; ovipositor flattened, with chitinous tube-like ending (Subfamily Lonchæinæ) 13
2. Face swollen, in profile convex 3
   Face flat, without convexity in the middle, in profile a straight line 7
3. Third anntenal joint greatly lengthened, pointed or slender and linear 4
   Third antennal joint shortened and oval, first joint shorter than second 6
4. Two sternopleural bristles; both fronto-orbital bristles reclinate; face not strongly gibbous. (Fig. 10.) ..... **Lauxania** Latreille.
   One sternopleural; anterior pair of fronto-orbitals convergent; face markedly gibbous 5
5. Head higher than long, occiput and front concave; the line connecting the fronto-orbitals converging in front, lower orbital bristle strongly inclined; facial groove nearly touching lower angle of eye, extending back under the eye so that the face is strongly developed underneath as well as in front; ocelli not elevated. (Fig. 6.) ..... **Physogenia** Macquart.
   Head more globular, the front convex; fronto-orbital bristles in parallel rows; facial groove parallel with margin of eye, continuing obliquely downward leaving the cheeks free, the face in front of and not beneath this line; ocellar triangle somewhat raised. (Fig. 7.) ..... **Pachycerina** Macquart.
6. Face with a transverse groove above the mouth, or with lateral vestiges of a groove, the oral margin projecting more or less in front of this groove; arista sometimes pubescent. (Fig. 12.) ..... **Caliope** Haliday.
   Face swollen, with or without a transverse groove above the mouth, but the oral margin retracted beneath or behind this groove; arista plumose. (Fig. 11.) ..... **Xangelina** Walker.
7. In profile the angle formed by the front and face acute, less than 90 degrees; front less inclined than the face, so that the mouth opening is strongly retracted 8

Angle of front and face obtuse, the front more inclined than the face, the mouth opening therefore not retracted 9

8. Posterior cross-vein in middle of wing; third vein sinuous. (Fig. 4.) ..... **Procrita** Hendel.

Posterior cross-vein beyond the middle of wing; third vein straight; eyes horizontally oval. (Fig. 8.) ..... **Trigonometopus** Macquart.

9. Both fronto-orbital bristles reclinate 10

Anterior pair of fronto-orbitals extending inwards and forwards; 1 sternopleural; third joint of antennæ elongate. (Fig. 9.) ..... **Camptoprosopella** Hendel.

10. Front forming no evident angle with the face; head higher than long; fourth vein bowed forward at tip of wing, narrowing the first posterior cell. (Fig. 5.) ..... **Griphoneura** Schiner.

Front and face forming an evident though rounded and obtuse angle; head as long as high 11

11. Orbital bristles arising from tubercles; wings rather slender basally. (Fig. 3.) ..... **Chætocœlia** Giglio-Tos.

Orbits without tubercles; wings not narrowed on basal half 12

12. Thorax opaque or sub-opaque, ground color usually dark, ocellar bristles usually large and spaced far apart near the front ocellus, behind the ocellars typically one or two pairs of outwardly diverging small bristles; arista usually plumose and at the same time the scutellar bristles usually cruciate; front often relatively broad; wings rarely pictured; hind tibiæ often marked with a basal ring. (Fig. 14.) ..... **Minettia** Robineau-Desvoidy.

Thorax shining or but slightly pollinose, its ground color usually yellow; ocellar bristles usually small and placed close together behind the front ocellus, the other bristles rarely present; arista often pubescent and scutellar bristles generally parallel or diverging; convergent scutellar bristles typically not occurring with a plumose arista; front usually narrower; wings often pictured; hind tibiæ rarely annulate. (Fig. 13.) ..... **Sapromyza** Fallen

13. Metallic black species; front rather narrow; two dorsocentral bristles. (Fig. 15.) ..... **Lonchæa** Fallen.

Yellow, largely yellowish, or cinereous species, not metallic: front broad; four dorsocentrals. (Figs. 16–21.) ..... **Palloptera** Fallen.

Lauxania Latreille, sensu lato.

Including *Lauxania* s. str., *Caliope* Haliday, *Xangelina* Walker, *Minettia* Robineau-Desvoidy, and *Sapromyza* Fallen.

1. Dorsum of thorax black or blackish in ground color, overlaid or not with pollinose coating; wings never pictured (except sometimes extreme base of cross-veins infuscated) 2

Mesonotum yellow, testaceous, reddish, or brown, not black in ground color, except rarely a median dark vitta; wings often pictured 45

2. Third antennal joint linear, elongate, cylindrical, the first joint as long as or longer than the second; center of face protuberant; facial orbits white pruinose (*Lauxania* sensu stricto) 3

Third antennal joint ovate or oblong-ovate, not more than four times as long as broad, the first joint shorter than the second; center of face gibbose (*Caliope* and *Xangelina*) or not (*Sapromyza* and *Minettia*) 10

3. Wings short and broad, brown; second vein arched forward; scutellum long and flat; four rows of acrostichals, the middle rows very indefinate; arista plumose. (N. J.; Fla., Aldrich; Ga.*) ..... **Lauxania latipennis** Coquillett.

Wings not abnormally broad and short, the submarginal cell not broadened at the expense of the marginal; scutellum shorter 4

4. Knob of halteres black; calypteres and fringe dark; base of wings darker than remainder; arista short-plumose; front legs black, the posterior tibiæ and tarsi brown 5

Halteres yellow or white; calypteres rarely dark; wings not blackened at base; arista white 7

5. Scutellum convex; body and head polished; periorbits broad, cœruleous, the median vitta of front shining black. Eur.*, N. Scot., Mass.*, N. Y.*, (N. J., Pa., Mich., Wisc. Aldrich), Ga., N. Mex., Queb.*, Ont.*, B. C,*, Alaska*. (Fig. 10.) ..... **Lauxania cylindricornis** Fabricius.

Scutellum flat, white pollinose; mesonotum white pollinose except a narrow median stripe and the sides broadly; pleuræ with two white pollinose spots .. 6

6. Face completely white pollinose; front opaque with the sides white pollinose, a lateral vitta cinereous and the median vitta black; arista dark except base. Fla., N. J ..... **Lauxania opaca** Loew.

Face with a middle line and lateral vittæ more or less white-pollinose, otherwise shining; front shining black except the narrow orbits, but viewed from above showing a black median vitta and lateral black spots circumscribed with white pollen; arista pale. (*facialis* Coquillett) Fla., Ga.*, La.*; Tenn. Aldrich ..... **Lauxania trivittata** Loew.

7. Arista densely pubescent with appressed white hairs; front shining black 8

Arista loosely plumose; center of front opaque black; legs largely whitish 9

8. Mesonotum and scutellum whitish pruinose; front tibiæ and tarsi black; front femora and posterior legs brownish; lunule red; 3 dorsocentrals, 4 acrostichal rows. Ariz.; Mono Lake, Cal. Aldrich.
..... **Lauxania nigrimanus** Coquillett.

Head, thorax and abdomen shining, with slight coppery tinge; legs brownish but the posterior femora largely black; 4 dorsocentrals, 2 acrostichal rows. Cal.* ..... **Lauxania albiseta** Coquillett.

9. Scutellum velvety black except at base; legs whitish, the coxæ and femora black; wings yellowish. N. J., Pa., Ga.; Kans., Tenn. Aldrich.
..... **Lauxania femoralis** Loew.

Scutellum shining, lightly white pollinose; front legs ♂ black from end of femora to tip of metatarsi, remainder of front tarsi white; costal part of wings yellowish, apex and posterior part infuscated. Pa.
..... **Lauxania manuleata** Loew.

10. Face more or less protuberant in center, in part at least polished, although sometimes with oral, orbital or subantennal pruinose markings; halteres yellow .. 11

Face flat or concave, wholly silvery, white, yellow or gray pruinose, or otherwise marked with pollen, not polished; halteres sometimes black 24

11. Antennal arista bare or microscopically pubescent; wings nearly hyaline.....12
Antennal arista moderately or long plumose, or with dense pubescence; front not yellow, except sometimes a spot on lunule; wings yellowish.....16
12. Front not vittate; insect entirely black, except halteres and wings. Cal.*
.....**Caliope nigerrima** sp. nov.
Front vittate with reddish.....13
13. Head largely yellow or red.....14
Head black, the front anteriorly and the face in part yellowish.....15
14. Very robust, cheeks broad; head reddish except for an occipital fascia, three frontal vittæ, the middle one triangular, and six facial spots; scutellum and base of abdomen reddish; legs reddish, femora in part black; thorax pollinose; third antennal joint elongate; 3 dorsocentrals, 2 sternopleurals; scutellars strongly diverging. Tex.; Miss. Aldrich.....**Minettia eucephala** Loew.
Head yellow, the ocellar region and short lateral vittæ black; third antennal joint ovate; legs blackish, the knees and end of tibiæ tipped with yellow; thorax shining. D. C.....**Caliope flaviceps** Loew.
15. Third antennal joint less than twice as long as wide; legs yellow except base of femora; 4 dorsocentrals. Tex.*, Ariz.....**Caliope variceps** Coquillett.
Third antennal joint over three times as long as wide; legs black, the knees and posterior tibiæ and tarsi yellow; 3 dorsocentrals. Ariz., N. M.
.....**Caliope longicornis** Coquillett.
16. Scutellum flat and velvety black; legs whitish, the femora black.....17
Scutellum convex and not velvety.....18
17. Scutellum entirely velutinous; center of front shining, laterally with a bisected dead-black spot. Tex.*; Kans. Aldrich.....**Caliope signatifrons** Coquillett.
Scutellum subshining at base; front opaque black above the antennæ, laterally shining; arista very long-plumose. Mass., Pa.*, N. J. (Fig. 12.)
.....**Caliope gracilipes** Loew.
18. Front tibiæ largely blackish.....19
Front legs including coxæ yellow; arista short-plumose, white, the base yellowish; face strongly gibbous. Cal.*.....**Lauxania albiseta** Coquillett.
19. Thorax and scutellum white pruinose; front tibiæ and tarsi black, contrasting with remainder of legs; arista densely white-pilose. Ariz., Cal.
.....**Lauxania nigrimanus** Coquillet.
Thorax and scutellum shining, not or scarcely pruinose; arista dark.....20
20. Thorax with slight metallic tinge; pleuræ sometimes more or less brownish (compare species of alternate also).....21
Thorax polished black, but scarcely metallic.....22
21. Thorax cæruleous, becoming reddish in back and on sides; pleuræ brownish; femora and tibiæ brownish, base of tarsi whitish. Mex., S. Am.
.....**Caliope? flavipennis** Fabricius, Wiedemann,
Thorax chalybeous, pleuræ sometimes brownish in part; legs black, the tibiæ and tarsi yellow; 2 dorsocentrals, acrostichals numerous; third antennal joint oblate-ovate; face moderately convex. S. Am., Mex., W. Ind., Ala., La.*, N. J.; Orizaba, Aldrich.....**Caliope muscaria** Loew.
22. Face in profile incised at middle, bulbous only beneath antennæ; arista pilose.23
Face large, bare, smooth, evenly convex from side to side and from antennæ

to near the oral margin, just above the oral margin a narrow horizontal groove; arista plumose; deep shining black throughout, the third antennal joint and four posterior tarsi reddish. W. Ind., S. Am. (Fig. 11.)
..... **Xangelina nigra** Williston.

23. Face glistening beneath the antennæ; third antennal joint four times as long as wide, dark; legs black, except knees and posterior tibiæ and tarsi. Eur., N. Scot., Wash.*..... **Caliope elisæ** Meigen.

Face pollinose immediately beneath antennæ; third antennal joint three times as long as wide, often reddish; legs entirely yellowish. Cal., Vanc., Wash.*, Id.* (*livingstoni* Coquillett)..... **Caliope quadrisetosa** Thomson.

24. Some of the abdominal segments marked with spots; thorax opaque gray pruinose..... 25

Abdomen not regularly spotted..... 31

25. Arista long-plumose..... 26

Arista short-pubescent; mesonotum with four fuscous vittæ, scutellum with two fuscous dots; front bivittate; abdominal segments with four series of brown spots; legs yellow..... 30

26. Abdominal segments yellow, marked with pairs of blackish spots; thorax not vittate; scutellum cinereous black..... 27

Abdomen largely black..... 28

27. Lower part of pleuræ yellow; 2 dorsocentrals and 1 sternopleural. Kans.
..... **Minettia crevecœuri** Coquillett.

Pleuræ concolorous with notum; 4 dorsocentrals and 2 sternopleurals. Md.
..... **Minettia glauca** Coquillett.

28. Abdomen largely blackish, base and tip yellow, dull with thick cinereous coating; thorax uniformly cinereous, but humeri and scutellum yellow; 4 acrostichal rows; legs yellow; last sections of fourth vein subequal. Wash.*
..... **Minettia univittata** var.

Abdomen polished; thorax vittate with brown; scutellum largely or wholly black..... 29

29. Abdomen black, base and tip yellow, each segment with lateral gray pruinose spots; legs whitish; thorax with four vittæ; face whitish; hind cross vein broadly brown; cross veins approximate. Nicaragua.
..... **Minettia albipes** Coquillett.

Abdomen black with hind margins of segments brownish and pollinose, fifth segment with four gray pruinose spots; legs black except tibiæ and most of tarsi; thorax with three vittæ; cheeks with black spot. Nicaragua. (*varia* Coquillett.)..... **Minettia variata** Hendel.

30. Abdominal segments marked with four brown spots; femora not with patches of setulæ; antennæ often black at base; cheeks with large blackish spot; Pa., N. J., N. H., Can.; Tenn., Mich., Wisc. Aldrich.
..... **Minettia quadrilineata** Loew,

Abdominal segments marked with many small brown setigerous spots; front femora with a row of minute setulæ on distal part of flexor surface; antennæ yellow. Me.*; Tenn., Wisc. Aldrich; Wash.*..**Minettia annulata** sp. nov.

31. Face silvery pollinose on a brown ground; thorax and abdomen shining bluish

black, the pleuræ brownish; femora blackish, tibiæ brownish, tarsi whitish. 5.3 mm. S. Am., W. Ind. ..... **Minettia argyrostoma** Wiedemann.

Otherwise; if the face is silvery the thorax is pollinose 32

32. Arista pubescent or bare 33

Arista plumose 36

33. Body very slender; black, thorax gray pruinose, legs brown, the posterior tibiæ and tarsi yellow; antennæ yellow, arista bare; wings four times the length of the abdomen. N. H., Alaska.
..... **Minettia brachystoma** Coquillett.

Third antennal joint partly blackish, arista pubescent 34

34. Mesonotum trivittate; front with median brown vitta 35

Mesonotum and scutellum uniformly dusted; front shining black except a yellow anterior fascia, face silvery-dusted; legs blackish. Wash.*
..... **Minettia nigrans** sp. nov.

35. Face silvery white; center of scutellum brownish; abdomen black; femora blackish, tibiæ brownish, their base yellow, tarsi more or less yellowish. St. Vincent ..... **Minettia exul** Williston.

Face with small brown spot each side of center; scutellum gray-pruinose; 3 dorsocentrals of which one is presutural, 2 acrostichals, 2 sternopleurals; venter yellow, dorsum of abdomen fuscous; base and middle ring of tibiæ yellow. 2.5 mm. Ga.; Tenn. Aldrich ..... **Minettia vittigera** Coquillett.

36. Wings blackish at base; halteres black; thorax opaque black; abdomen black. 37

Root of wing not blackened; halteres yellow; thorax grayish pollinose or subshining 38

37. Front less broad, face shorter and less convex, abdomen shining. Can., Pa., N. J., N. H. ..... **Minettia obscura** Loew.

3 dorsocentrals, 6 rows acrostichals; abdomen subshining, grayish pollinose. Eur., Mass., N. J.*, Me.*, Pa.*, Que.*, Ont., Ill.*; Wisc., Mich. Aldrich.
..... **Minettia longipennis** Fabricius.

38. Mesonotum very lightly gray pollinose, shining; 3 dorsocentrals, 4 acrostichals; head shining black. Eur., N. Am. (*frontalis* Loew).
..... **Sapromyza hyalinata** Meigen.

Mesonotum and head opaque 39

39. Mesonotum opaque gray pollinose, with lateral margins brownish; strikingly marked with brown setigerous spots; 2 dorsocentrals, 1 sternopleural; scutellum gray pruinose; abdomen polished black, somewhat brassy. Fla., Cuba, Aldrich ..... **Minettia cineracea** Coquillett.

Mesonotum not marked with brown spots 40

40. Mesonotum vittate; abdomen largely or wholly black 41

Mesonotum densely cinereous pruinose, not vittate 42

41. Mesonotum blackish, almost opaque, with two narrow gray vittæ, scutellum black, abdomen reddish terminally; head yellow; legs light yellow. W. Ind.
..... **Sapromyza puella** Williston.

Mesonotum opaque black, with four white-pollinose vittæ; scutellum black with white-pollinose margin; abdomen thinly gray-pollinose, shining at apex; head black. W. Ind. ..... **Minettia albovittata** Loew.

42. Scutellum bordered with velvet black: palpi black; legs mostly yellow; 3 dorsocentrals, 4 acrostichals. Eur.*, Alaska, Que.*, B. C.*, Vanc,*. Mass.*, N. H., Vt.*, N. Y., N. J., Pa.*, Ill.*, Mont.*, Wyo.*, Id.*, Wash.*, (Mich., Wisc., Or., Tenn., Kans. Aldrich) (Fig. 14) . . . **Minettia lupulina** Fabricius.

Scutellum entirely gray-pollinose; palpi yellow. 43

43. Abdomen black, cinereous pruinose, base of segments 3, 4, 5, black-fasciate; head yellow, upper part of occiput and vertex black; legs mostly black. Nev.; Pine Lake, So. Cal. Aldrich; Wash.* . . . . . **Minettia cæsia** Coquillett.

At most a brownish fascia on those segments; head mostly black in ground color. 44

44. Legs yellow, front of femora, a basal ring and apex of tibiæ sometimes darker; face yellowish with central U-shaped brown spot and facial grooves black. D. C. . . . . **Minettia magna** Coquillett.

Legs black; face uniformly overlaid with gray pollen. Mass.* . . . . . **Minettia cana** sp. nov.

45. Species whose wings are marked or spotted in some way or other. 46

Species with wings not at all ornate, except sometimes at very base, or with uniform infuscation. 63

46. One or both cross-veins alone with brown clouding; usually 4 dorsocentrals. . . 47

Costal margin before submarginal cell as well as one or both cross-veins brown; generally 3 dorsocentrals. 51

2, 3 and 4 veins tipped with a brown dot, cross-veins clouded and third vein with one or two additional spots. 61

With numerous confluent black dots and an apical spot surrounded by eleven dots; opaque gray spotted with brown on head, thorax and abdomen; legs yellowish, femora with two rings, tibiæ with one; halteres black. D. C., Tex. . . . . **Minettia stictica** Loew.

47. Arista long-plumose; thorax with four brown vittæ; face with black central spot; front with ocellar mark; base of antennæ black; abdominal segments trimaculate; hind tibiæ ringed. Nicaragua, Tex. . . . . **Sapromyza picticornis** Coquillett.

Arista short-plumose or pubescent; thorax yellowish; face and front uniformly yellow; antennæ yellow; abdomen not spotted; tibiæ not ringed. 48

48. Thorax opaque, dusted; 3 dorsocentrals, 6 uniform acrostichals; arista nearly bare; front longer than broad; hairs of lower facial ridge large; mesopleuræ setulose. Ill.*; Kans. Aldrich. . . . . **Minettia ordinaria** sp. nov.

Thorax subshining; 4 dorsocentrals, 4 acrostichals, the middle rows setiform; mesopleuræ bare. 49

49. Arista short-pubescent; front broader than long; brown of cross-veins suffused. 50

Arista plumose; front longer than broad; clouds of cross-veins blackish; macrochætæ strong. Ill.*; Or. Aldrich. . . . . **Minettia nubila** sp. nov.

50. Last ventral segment ♂ dilated or with two strong black teeth, lamellæ rounded and black-pilose; abdominal segments margined with long setæ; ocellar bristles closer together than width of front ocellus. Neb.; Mass.*, Vt.*, Ill.*, Ind.*, (Mich., Wisc., S. Dak., Kans. Aldrich) . . . . . **Sapromyza bispina** Loew.

Abdomen not furnished with spines; entire insect yellow; ocellar bristles separated more than the width of the front ocellus; ♂ lamellæ long and linear Mex., N. J., B. C.*; Cal. Aldrich..... **Sapromyza innuba** Giglio-Tos.

51. Mesonotum vittate; face maculate.....52
Mesonotum not vittate; face not spotted.....54

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83. Shining luteous species with black palpi and a black ocellar spot; mesonotum with two lighter vittæ. Ga., Fla., N. J., N. Y. ..... **Sapromyza resinosa** Wiedemann.
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88. Front as broad as long; arista long-plumose on upper side. Fla., Ga., W. Ind.*; Tenn. Aldrich ..... **Sapromyza sordida** Wiedemann, Williston.
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89. Front with central black spot; 4 dorsocentrals; third antennal joint twice as long as deep, the upper side excised. Wyo.* ..... **Sapromyza cyclops** sp. nov.
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92. Third antennal joint black; arista short-pubescent; palpi mostly black; thorax shining yellow with three broad brownish stripes, the middle one obsoletely geminate. W. Ind. ..... **Sapromyza venusta** Williston.
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93. Mesonotum with a median broad dark stripe, at least the humeri yellow; hind femora tipped with minute shining black dot on each side; 3 or 4 dorsocentrals, 4 acrostichals; front yellow. Cal.* ..... **Minettia univittata** Coquillett.
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94. Face with a U-shaped brown mark flanked by an oblique stripe; pleuræ not vittate; femora striped with gray in front, tibiæ with a basal ring. D.C. ..... **Minettia magna** Coquillett.

Face yellow; pleuræ vittate above; legs yellow. Kans. ..... **Minettia crevecœuri** Coquillett.

Caliope nigerrima sp. nov.

♂. Length 3 mm. Entirely black, the halteres, calypteres and wings alone yellowish. Front shining, with slight coppery hue, slightly broader than long, the ocellar bristles approximate: face in profile convex only near the antennæ, broadly angulate at the middle; center and sides of the face white-pruinose; lower occiput white-pruinose. Third antennal joint elongate-oval, twice as long as wide, the black arista microscopically pubescent. Palpi linear, black-hairy. Mesonotum shining greenish black, thinly coated with olivaceous pollen; four dorsocentrals, acrostichals very sparse, apical scutellars divergent, two sternopleurals. Abdomen shining, slightly metallic. Wings hyaline, with yellowish tinge, veins yellow, last two sections of the fourth vein nearly one to two.

A single specimen taken by Professor Aldrich at Pacific Grove, California, May 6, 1906.

The profile of the face indicates that this species is related to *quadrisetosa* and *elisæ*, but the uniformly black color and the subbare arista are different.

Caliope elisæ Meigen.

Meigen's original description calls for a species with white arista and red antennæ. Zetterstedt states that the arista is white and the tip of the antenna is brown. Schiner says that the infuscation of the antenna is variable and that the arista is light brown; while Rondani and Becker give the arista as brown.

This species was included in the North American fauna on Walker's authority. I have a series of specimens from Mount Constitution, on Orcas Island, Washington, that agree with the descriptions of *elisæ*, and may or may not be the same as the European species. In the absence of typical specimens of *elisæ* it would be premature either to describe them as new or to vouch their identity. They have the face but little bulbous beneath the antennæ and below the swelling it is excised in profile. This character is quite different from the evenly convex face of *cylindricornis*, with which species *elisæ* is repeatedly compared. The third antennal joint is dusky, four times as long as deep, its upper and lower edges parallel, so that before the tip it is not smaller

than in the middle. The face is pollinose only along the orbits and not at all in the middle beneath the antennæ. The front legs are the darkest, their knees only are broadly yellowish.

Minettia nigrans sp. nov.

♀. Length 4 mm. Shining black, with pale wings. Occiput shining black; front one-fourth broader than long, shining black with bluish tinge, especially on the broad paraorbits, the front edge above the antennæ yellow, ocellar bristles moderate, rather distant; face not convex, uniformly white-pruinose; cheeks white-pruinose except the narrow shining oral margin; proboscis and palpi black. Thorax highly shining black, but the disc of the mesonotum dusted with gray, scutellum concolorous; three postsutural dorsocentrals, four rows of acrostichals, two sternopleurals; mesopleuræ with weak setulæ; scutellar bristles long, convergent. Abdomen shining black, the marginal setæ about two-thirds the length of the segments. Front legs entirely black, middle femora black except the knees, their tibiæ and tarsi blackish, hind femora black, the tibiæ and tarsi blackish, hind tibiæ without preapical bristle. Halteres white. Wings large, clear hyaline, veins pale, the last two sections of fourth vein proportioned two to five.

One specimen from Monroe, Washington; May 20, 1908.

Minettia cana sp. nov.

Like *lupulina* but the scutellum not bordered with black, palpi yellow, face uniformly gray-pruinose, and front lacking the conspicuous yellow fascia: like *glauca* but the abdominal segments not spotted and the front differently marked.

♀. Length 4 mm. Head and thorax black, thickly covered with blue-gray pollen. Middle of front with a broad brown fascia and orbits with a triangular brown spot at the level of the antennæ. Above the base of the antennæ the front shows but little trace of yellow ground-color, but is blue-gray pruinose like the face, vertex and occiput. Ocellar bristles distant, behind them are six cruciate setulæ. Antennæ reddish brown, the third joint ovate, with short-plumose brown arista. Palpi reddish yellow; proboscis black. Three dorsocentrals, four rows of acrostichals, the acrostichals and the other setulæ strong, metapleuræ setulose, two sternopleurals: mesonotum not vittate, scutellum uniformly cinereous above. Abdomen entirely yellowish, the segments not margined with long setæ. Legs blackish, the front legs black, front femora cinereous, knees narrowly yellowish, posterior tibiæ with base and a broad medial ring somewhat paler, hind tibiæ without preapical bristle. Halteres yellow. Wings uniformly with yellow tinge, as in *lupulina*; the last two sections of the fourth vein equal.

One specimen received with a lot of *lupulina* from Dr. Garry deN. Hough, who took it at New Bedford, Massachusetts, on Memorial Day, about twelve years ago.

Minettia annulata sp. nov. = annularis see p. 203

♂ and ♀. Length 3 mm. Very close to *quadrilineata* Lw., in size, structure, chætotaxy, color, and variations in color, but distinguishable by its different sexual structures, the setulæ of the front femora, and the maculation of the abdomen.

Ground color mostly blackish, although sometimes quite testaceous, overlaid on head and thorax with dense cinereous pollen. Front large, a little broader than long, with two well-defined darker vittæ extending from the antennæ to the level of the posterior ocelli, elsewhere cinereous; ocellar bristles of moderate length and well separated from each other; face cinereous-white, the ground color beneath the antennæ sometimes more or less blackish, along the orbits whitish; below the eyes the cheeks are marked with a large darker spot. Antennæ yellowish, the third joint ovate; arista short-pubescent. Palpi black. Mesonotum blackish to testaceous, with alternating stripes, five cinereous and four fuscous, with four strong dorsocentral bristles, of which one is presutural, with but two definite rows of minute acrostichals, one intraalar; mesopleuræ with scattered short hairs; two sternopleural bristles: scutellum rather flat, cinereous except for the continuation on its disc of the median fuscous vittæ of the notum. Abdomen subshining, brownish to yellow, with numerous small brownish mottlings, most distinct at the bases of the submarginal rows of bristles, the mottlings toward the base of the segments sometimes confluent to form vague resemblances to the maculations of *quadrilineata*; hind margins of segments paler; marginal bristles nearly as long as the segments; hypopygium narrowly and deeply cleft, the two sides of the emargination sharply projecting ventrally as a pair of finger-like processes, ventrally at the base of the hypopygium there is another pair of black acuminate recurved processes. Femora brown to yellow but the underside of each with a well-defined dark spot near the distal third, the spot of the front pair provided in both sexes with a row of about ten microscopic close-set black teeth along the inner edge: tibiæ with basal dark ring opposite the femoral mark; tarsi dull yellowish. Halteres whitish. Wings uniformly subhyaline, the last two sections of the fourth vein proportioned three to five.

Nine specimens are before me from East Eddington, Maine (Hough), Price County, Wisconsin (C. F. Baker), Knoxville, Tennessee (Aldrich collection), and Mount Constitution, Washington, July 3, 1908.

Loew's species *quadrilineata*, well represented in Professor Aldrich's collection from Pennsylvania, Michigan, Tennessee, and Wisconsin, differs as follows: The stouter hypopygium is broadly emarginate, the finger-like prolongations of the sides of the excision dark in color and the basal pair of black acuminate processes straight and approximate. Unless the hypopygium is open these structures are not to be seen. The femora usually lack the distal black spot and always are devoid of the row of

denticles. Moreover, the maculation of the abdominal segments is not in the form of small setigerous spots.

Minettia nubila sp. nov.

♀. Length 4 mm. Body with antennæ, mouth-parts, legs and halteres entirely flavous, wings hyaline with yellowish tinge, the cross-veins broadly blackish. Third antennal joint oval, one-half longer than deep, the black arista moderately long-plumose, the hairs of the lower side nearly as long as the upper. Front slightly longer than broad, not shining; ocellar bristles long, located on a line with the posterior ocelli but in back of the front ocellus; hairs of lower facial ridge minute; postverticals strong. Thorax lightly dusted, subshining, not vittate, thoracic bristles relatively strong, four dorsocentrals, the foremost much in front of suture, four rows of acrostichals, the middle rows setiform, two sternopleurals, scutellar bristles convergent. All the abdominal segments but the first with submarginal rows of bristle-like hairs. Brown cloud of anterior cross-vein extending along the third and fourth veins to form an H-shaped spot, brown of posterior cross-vein similarly extending on the fourth vein, but not on the fifth, so that its outline is narrowly triangular.

One specimen, collected near Chicago, Illinois, August 10, 1901. Another typical specimen in Professor Aldrich's collection is labeled Lawrence, Kansas.

VAR. A female specimen from Hood River, Oregon, in Professor Aldrich's collection differs in having the bristles reduced in size. The genitalia are small, with the lamellæ of the ovipositor blackish and densely dark-pilose. The front is relatively a little broader and the clouds of the cross-veins are less distinct.

Minettia ordinaria sp. nov.

♂. Length 4 mm. Dull testaceous including the appendages; wings hyaline, the cross-veins with faint clouds. Third antennal joint broadly oval, the black arista with very short pubescence. Front slightly longer than broad, opaque with reddish pollen, except that the orbital bristles arise from spots of yellowish-gray pollen. Ocellar bristles moderate in length, spaced apart a little more than the width of the front ocellus, the lesser ocellar bristles distinct; occipital setulæ and those of lower facial ridge conspicuous, the foremost like an oral vibrissa. Thorax opaque, not vittate; setulæ of thorax well developed, forming six acrostichal rows; mesopleuræ with numerous setulæ in addition to the usual macrochæta; three dorsocentrals, all postsutural. Marginal setæ of third and fourth abdominal segments as long as the segments: hypopygium, small, the lamellæ retracted. Tibial spurs of moderate length. Penultimate section of fourth vein two-thirds the length of the ultimate section.

One specimen, collected in 1897 at Chicago, Illinois, and another in Professor Alfdrich's collection taken at Lawrence, Kansas.

Minettia fumipennis sp. nov.

♂. Length 5 mm. A stout and large species easily recognized by its strongly infumated wings. Very close to *flaveola* Coquillett, differing only in the dark wings, more protuberant center of the face and shorter plumosity of the arista. In *flaveola* the hairs of the upper side of the arista are as long as the depth of the third antennal joint and also conspicuously longer than the hairs below. In *fumipennis* the hairs of both sides of the arista are of the same length and are less than one-half the depth of the third antennal joint, i. e. short-plumose. The infuscation of the wings is strongest in front: along the hind border the wings are subhyaline. Chætotaxy and structure as in *flaveola*. Color testaceous.

One specimen in Professor Aldrich's collection, taken near Stanford University, California, 21 October, 1905.

Sapromyza cyclops sp. nov.

♀. Length 4 mm. Testaceous yellow throughout, except a shining black spot in center of front, and outer one-half of third antennal joint black. Front one-third broader than long, shining; ocellar bristles strong and closely approximate behind the front ocellus; cheeks two-thirds the eye-height; face flat, the central part sericeous. Third antennal joint nearly twice as long as the width in front of the arista, its upper edge concave so that the upper apical corner is rounded-rectangular; arista microscopically pubescent. Thorax lightly yellow-tomentose, four postsutural dorsocentrals, the rows diverging posteriorly so as to meet a moderately-sized intraalar bristle; six rows of scattered acrostichals; two sternopleurals. The abdomen of the dried specimen is somewhat brownish, lightly pollinose, the last segment shining. Femora with the usual bristles of moderate size. Wings hyaline, with yellowish tinge, veins yellow, the posterior cross-vein darker; anterior cross-vein a little beyond the middle of the discal cell, opposite the end of the first vein; penultimate section of the fourth vein four-fifths as long as the ultimate, last section of fifth vein one-half the length of the posterior cross vein.

The distinguishing characteristics of this species are the yellow color, black-spotted front, black-tipped antennæ with excised antennal joint and nearly bare arista, and clear wings.

One specimen collected by Dr. W. M. Wheeler at Dinwiddie Creek, Wyoming, September 5, 1895.

Sapromyza monticola sp. nov. (fig. 13)

♂ ♀. Length 3.5 mm. Entirely testaceous, except the tip of the antennæ.

Front about one-fourth broader than long, fine-hairy in front, shining, a line connecting the front-orbital bristles would meet the base of the antenna; ocellar bristles spaced apart the width of the front ocellus just behind which they are located, the lesser ocellar bristles minute; face receding, but the clypeus prominent,

in color pale yellow, neither shining nor sericeous, the central part of the face is twice as broad as the sides: cheeks scarcely one-half the eye-height, the lower edge with minute hairs: palpi and proboscis yellow, rarely the tip of the palpi blackened: Third antennal joint oval, one-half longer than broad, the outer third to half blackened, the arista microscopically pubescent.

Mesonotum shining, very thinly yellow-pollinose, three postsutural dorsocentrals, four definite rows of acrostichals; one intraalar, apical scutellars convergent, usually but one pronounced sternopleural, mesopleuræ not setulose. Abdomen shining, no long marginal bristles, hypopygium small, compressed. Front tarsi sometimes a little dusky. Wings with decided yellowish tinge, the last section of the fourth vein nearly two times the penultimate section, the last section of the fifth vein nearly as long as the posterior cross vein.

Seventeen males and twelve females. One specimen from Bellingham, Washington, two from Tacoma, all the others from Moscow Mt., Idaho; June to August. One female is a variant in having the anterior cross vein located further towards the end of the wing, so that the penultimate section of the fourth vein is about one-third the ultimate.

Genus **Camptoprosopella** Hendel.

1. Mesonotum and pleuræ each with a median dark vitta; wings strongly infumated. Mex., N. Mex., Col.* (*melanoptera* Hendel) ..... **dolorosa** Williston.
   Thorax not or but faintly vittate; wings nearly hyaline 2
2. Arista densely plumose, third antennal joint somewhat tapering, three times as long as broad. N. J., Fla., Ga.*, N. Mex., Peru; S. Dak. Aldrich. (*xanthoptera* Hendel) (fig. 9) ..... **verticalis** Loew.
   Arista more loosely plumose, the third antennal joint oblong-ovate, less than three times as long as broad. Me., Ont.*, Mass., N. Y., N. J.*, Pa.*, Ind.*, Ill.*, Wisc., La.*, Ala.*, Tex.*, N. Mex., Col.*, Wyo.*, Cal.*, Mex., Nicaragua,* W. Ind.*, S. Am.; (N. H., Mich., S. Dak., Ia., Kans., Vera Cruz, Oaxaca, Puebla, Cuba, Aldrich) (*cincta* Loew; *plumata* Wulp; *ocellaris* Townsend; *claripennis* Coquillett) ..... **vulgaris** Fitch.

Mr. Aldrich has informed me that Mr. Coquillett corrected the name *clavipennis* to *claripennis* in the separata he distributed, and Mr. C. W. Johnson, who has recently examined his type specimen of this species in the National Museum, writes that it is *verticalis*, under which name he submitted the specimen. The error in describing the species as new under the name *claripennis* was occasioned by Mr. Coquillett's misidentification of the dark colored *dolorosa* as *verticalis*. So writes Mr. Johnson.

Genus **Chætocœlia** Giglio-Tos.

1. Wings brown except most of second posterior cell and the anal angle which are hyaline, brown of center of wing without clear spots; face not or but feebly maculate; thorax brown punctate. Mex. .....**palans** Giglio-Tos.
   Brown of center of wings with clear spots; face with two evident black spots....2
2. The larger part of the second posterior cell and of the anal angle brown, disc of wings with three clear spots, two on fourth vein and one on posterior cross-vein. Mex., S. Am. (fig. 3).....**distinctissima** Schiner.
   The larger part of the second posterior cell and of the anal angle hyaline.....3
3. The brown area of the wings between the second and fifth veins with many irregular clear spots; abdominal segments not margined with setigerous black spots. Mex.....**caloptera** Hendel
   Wings with two small round clear spots near tip of third vein and another above posterior cross-vein, near which spots the brown is more intensive, discal cell largely hyaline. W. Ind.....**angustipennis** Williston.

Genus **Griphoneura** Schiner.

Blackish, shining, thorax not vittate; antennæ yellowish, arista plumose; face white-pruinose; legs black, the tibiæ and tarsi brownish; wings yellowish with the apical third brown, more intensive in front. 5 mm. Mex., S. Am. (fig. 5.) .....**imbuta** Wiedemann.

Genus **Procrita** Hendel.

Shining yellow, abdomen black; costal half of wing brown, sharply extending in several places into the hyaline portion. Mex. (fig. 4).....**pectinata** Hendel.

Entirely shining yellow, the small ocellar triangle and the tip of the antennæ alone black; brown of wings including the costal portion, ends of the veins, and the hind cross-vein. Costa Rica.....**sigma** Hendel.

Genus **Trigonometopus** Macquart.

1. Wings hyaline, cross-veins bordered with brown, third vein with two brown spots; yellow, mesonotum quadrivittate and scutellum brown. Col. .....**punctipennis** Coquillett.
   No round wing-spots.....2
2. Costal margin narrowly brown, cross veins slightly clouded; reddish, mesonotun darker laterally. W. Ind. (fig. 8).....**rotundicornis** Williston.
   Wings with vitta including third and fourth veins and a cloud at end of second vein; yellow, thorax quadrivittate with brown, scutellum brown except a median line. Ga.....**vittatus** Loew.

Genus **Physogenia** Macquart.

1. With sub-alar round velvet-black spot.....2
   Without such mark on pleuræ; testaceous, thorax obscurely brown-vittate. Cal.....**planiscuta** Thomson.

2. Face translucent yellow; thorax weakly bivittate. S. Am., Mex.* (*urina* Giglio-Tos) ..... **ferruginea** Schiner.
Face trimaculate; thorax quadrivittate. W. Ind.*, S. Am.; Vera Cruz, Aldrich (*obscuripennis* Bigot, *variegata* Loew, *nasalis* Thomson) (fig. 6) ..... **vittata** Macquart.

This genus is easily recognized by the greatly swollen and translucent face. The species are reddish yellow in color. The brief description of *Lauxania planiscuta* by Thomson brings to mind the other species of Physogenia: the testaceous color, the convex protuberant glabrous face, the position of the anterior cross vein much beyond the end of the first vein and the vittate thorax are rather distinctive characters. Possibly it is a synonym of *ferruginea*. *Lauxania nasalis* Thomson is certainly the same as *vittata* Fabricius. The erect dark stripe of the pleura, surmounted by a velvety black spot, the black dots above the antennæ, and the greatly swollen face indicate the synonymy.

Genus **Pachycerina** Macquart.

The North American species previously assigned to *Pachycerina* are to be found in *Camptoprosopella*. The present species differs from the type of *Pachycerina*, the European *seticornis* Fallen, in the following structural characters which hardly have generic value: The occiput is flattened instead of convex, the face is gently convex instead of bulbous, the anterior fronto-orbital bristles are more strongly inclinate, the third antennal joint is elongate-linear and the short arista is loosely plumose, instead of the antennæ tapering and arista with appressed pubescence. There are three dorsocentral bristles, six distinct rows of acrostichals, one humeral, one presutural, two notopleural, one supraalar, two postalar, one pair prescutellar, four scutellar, the apical pair parallel, one mesopleural, one sternopleural and one prothoracic, all but the last two directed backwards, the sternopleural and prothoracic bristles directed upwards. *Seticornis* has four dorsocentrals and two rows of acrostichals, but the other bristles are arranged as in the following species.

From *Camptoprosopella* the present species differs in the convex face and narrower facial orbits. In *Camptoprosopella* the sides of the face are broad and join the oral margin so that the central portion of the face takes no part in the formation of the cheeks.

Pachycerina ornata sp. nov. (fig. 7)

♀. Length 4 mm. Largely testaceous, the lower part of the head paler yellow, ocellar prominence and a large round spot in center of face shining black. Base of antennæ reddish, becoming black beyond the arista; arista reaching but two-thirds the length of the third joint, loosely plumose, long- above and short-plumose below. Oral margin retracted; proboscis yellow, palpi black. Thorax with the following markings: humeri, scutellum and posterior half of mesopleuræ whitish yellow; two transverse bands blackish, one in front of scutellum including the pteropleuræ, and another including the front half of the mesopleuræ continuing across the notopleural suture to the mesonotal suture and then broadly interrupted across the disc of the mesonotum. Abdominal segments, except the first, with broad subbasal black fasciæ, interrupted along the median line. Legs yellow, front tarsi dusky, all the tibiæ with preapical bristle. Calypteres and fringe yellow, but a dusky spot on the margin. Halteres yellow. Wings hyaline, with a very faint yellowish tinge: anterior cross-vein beyond the end of the first vein, the last two sections of the fourth vein subequal; last section of fifth vein shorter than posterior cross vein and one-sixth the length of the preceding section.

Two specimens from Professor Aldrich's collection, received from Mr. Crawford, who collected them at Dona Marcia, Chiapas, Mexico.

Genus **Lonchæa** Fallen.

1. Arista plumose; third antennal joint short, testaceous; legs piceous, tarsi testaceous. Mex. ..... **discrepans** Walker.
   Arista bare or short-pubescent 2
2. Front with a median reddish vitta; venter yellowish, with a broad black stripe; legs brown. W. Ind., Ga. ..... **glaberrima** Wiedemann.
   Front and venter not red or yellow 3
3. Antennæ not reaching the oral margin 4
   Antennæ reaching or surpassing the oral margin 9
4. Legs entirely black or blackish 5
   Metatarsi yellow 6
5. Metallic black, scutellum more green, abdomen deep metallic green. 1.5 mm. W. Ind. ..... **orchidearum** Townsend.
   Shining black, scarcely at all metallic, abdomen thinly covered with brownish dust; calypteres with brown cilia. 3 mm. Eur., Alaska, Wash.* ..... **deutschi** Zetterstedt.
6. Cheeks bristly; front femora strongly setose beneath; two basal joints of tarsi yellow; calypteres yellow; head, thorax and abdomen deep metallic green; front of ♀ two times as long as wide, its sides parallel. St. Vinc.; Cuba, Aldrich. ..... **brevicornis** Williston.
   Cheeks hairy, at most with one or two bristles in front; legs not with stout bristles 7

7. Calypteres fringed with dusky hairs; lunule bare; base of tarsi alone yellow; arista bare 8
   Calypteres yellow, with yellow fringe; lunule hairy; tarsi largely or wholly yellow; arista microscopically pubescent; third antennal joint large, longer than broad; front of ♀ slightly narrowed anteriorly; epistome projecting. Eur., La.*; Id., Aldrich ..... **laticornis** Meigen.
8. Third antennal joint orbicular, not longer than broad; front broadly quadrate, not at all narrowed anteriorly, the lunula broadly arched; face retreating, the epistome retracted, the face very wide, its sides white-pruinose; tarsi noticeably flattened. Eur.; Id. Aldrich ..... **parvicornis** Zetterstedt.
   Third antennal joint longer than broad; front of ♀ narrowed anteriorly, the lunula highly arched; epistome projecting; side of face less pruinose and face not unusually wide. Eur.; Id. Aldrich, Mont.* ..... **viridana** Meigen.
9. Legs entirely black or blackish 10
   At least base of tarsi yellowish 13
10. Head, thorax and abdomen metallic blue-green; antennæ greatly surpassing the oral margin. S. Am., Mex. ..... **chalybea** Wiedemann.
    Head and thorax jet black, or at least but little metallic; antennæ reaching the oral margin 11
11. Vertex opaque, with three shining spots 12
    Vertex black; abdomen metallic black; legs and antennæ fuscous. Brazil, Cuba, N. H. (*nigra* Wied., 1830, nec. Meig. 1826) .. **wiedemanni** Townsend.
12. Anterior cross-vein beyond the apex of the auxiliary vein; calypteres pale yellow. Eur.*; Wash., Wisc. Aldrich ..... **vaginalis** Fallen.
    Anterior cross-vein before the apex of the auxiliary vein; calypteres fuscous. Eur., Alaska ..... **hyalipennis** Zetterstedt.
13. Calypteres with white cilia 14
    Calypteres with blackish cilia 15
14. Head, thorax and abdomen deep shining black; wings tinged with light brownish yellow; metatarsi yellow. W. Ind. ..... **longicornis** Williston.
    Thorax and abdomen more or less metallic blue-violet or bluish green; face entirely white-pruinose, nearly flat in profile; wings hyaline; tarsi yellow except the tip brown. Mass., N. H., N. Y., N. J., Pa., Ga., La.*, Ind., Ill.*, S. Dak.*, Ariz., Wash.*, Mex. [*polita* Say (1830); *cærulea* Walker (1849) *rufitarsis* Macquart (1851)] (fig. 15) ..... **polita** Say (1830)
15. Thorax pilose; front shining black. Eur., Ga., Id.* ..... **tarsata** Fallen.
    Hairs of thorax relatively short; front matte-black. Eur., Alaska. ..... **albitarsis** Zetterstedt.

Genus **Palloptera** Fallen.

1. Cross-veins not bordered with brown; thorax gray-pollinose; auxiliary and first vein and apex of wing brownish. Alaska, Wash.* (fig. 21) ..... **terminalis** Loew.
   Cross-veins bordered with brown; thorax and abdomen yellowish 2
2. First vein wholly included in the brown color, costa wholly or almost entirely brown 3

First and auxiliary veins brown only at costa, the base and middle of costa not brown, wing also tipped with brown. Eur.*, N. H. (fig. 17) ..... **arcuata** Fallen.

3. Front half of wing and posterior cross vein broadly brown..... 4
Wings mostly hyaline, the submarginal cell clear except at tip. Alaska, Wash.* Id.*, Col.; Cal., Nev. Aldrich. (fig. 19)..... **jucunda** Loew.

4. Head, thorax and abdomen largely cinereous-pruinose; brown pattern of wings sharply defined; abdominal segments setose; four rows of acrostichals. Mich. (figs. 16, 20)..... **setosa** sp. nov.
Head, thorax and abdomen shining yellow; brown of wings diffusing into hyaline portion..... 5

5. Abdomen setulose, but with strong marginal bristles arising from black spots; acrostichals dense. N. J.*, Pa., Que., N. H.; Va., Ia. Aldrich. ..... **superba** Loew.
Abdomen with hind edges of the segments narrowly and the sides broadly margined with black. Me..... **similis** Johnson.

Palloptera setosa sp. nov.

♂♀. Length 3.5 mm. Pale cinereous in color covered especially on occiput and mesonotum with whitish gray pruinosity; anterior portion of front, face, cheeks, scutellum, pleuræ, abdomen, halteres, calypteres and legs becoming yellowish; base of antennæ and mouth-parts testaceous; outer portion of third antennal joint infuscated. Arista dusky, pubescent. Four dorsocentrals, one of them presutural, four rows of sparse delicate acrostichals. Abdominal setæ arising from minute black dots, rather robust, the marginal ones a little stronger; fifth abdominal segment elongate. Anterior half of wing, apex and broad cloud about posterior cross vein infumated, a small clear costal spot just before the end of the auxiliary vein, the brown surrounding the cross-veins more saturate, remainder of wings clear hyaline; posterior cross-vein at right angles to the fifth vein; last section of fourth vein arched.

Two males and one female collected by Professor Aldrich at Battle Creek, Michigan. The female has a slender hyaline stripe extending down the middle of much of the submarginal cell.

Explanation of Plate 3.

1. *Poecilomyia* (new genus of Sciomyzidæ) *decora* Loew.
2. *Poecilomyia decora* Loew. Front and face.
3. *Chætocoelia distinctissima* Schiner. From Hendel.
4. *Procrita pectinata* Hendel. Wing, from Hendel.
5. *Griphoneura imbuta* Wiedemann. From Hendel.
6. *Physogenia vittata* Macquart. Profile of head.
7. *Pachycerina ornata*, new species. Profile of head.
8. *Trigonometopus rotundicornis* Williston. Profile, from Williston.
9. *Camptoprosopella verticalis* Loew. Profile of head.

10. *Lauxania cyclindricornis* Fabricius. Profile of head.
11. *Xangelina nigra* Williston. Profile of head, from Williston.
12. *Caliope gracilipes* Loew. Profile of head.
13. *Sapromyza monticola*, new species. Profile of head.
14. *Minettia lupulina* Fabricius. Front and face.
15. *Lonchæa polita* Say. Profile of head.
16. *Palloptera setosa*, new species. Profile of head.
17. *Palloptera arcuata* Meigen. Wing.
18. *Palloptera superba* Loew. Wing.
19. *Palloptera jucunda* Loew. Wing.
20. *Palloptera setosa*, new species. Wing.
21. *Palloptera terminalis* Loew. Wing.

BOOK NOTICE.

Injurious Insects. How to recognize and control them. By Walter C. O'Kane. Pp. 1–414; figs., 606. The Macmillan Company, New York.

This little book is without a parallel in so far as a concise and scientific treatment of economic entomology is concerned. It is built on a plan of three parts. Into the first part O'Kane gathers material which deals with the structure, habits and classification of insects. Some of the subjects in this part are very lightly touched, but enough of insect adaptations and habits are given to arouse an interest in people engaged primarily in the control of noxious forms. The second part deals with various methods of control such as crop rotation and mechanical means involving banding, screening and trapping. Many insecticides for biting and sucking insects are given as well as repellants and fumigants. This is followed by three illustrated chapters on spray machinery and its uses. Part three is entitled "Injurious Insects" and constitutes the bulk of the book. This section deals with insect pests of garden and field crops and with those infesting orchards and small fruits, followed by a chapter on household pests and one on those of domestic animals. Each economic species is treated separately, and with the aid of the excellent photographs which accompany each description, one is able to recognize the insect in question. The life history and habits which are naturally bound up with the injury inflicted to plant or animal are discussed in a clear and concise manner. If a method of control is known, it invariably follows.

O'Kane's conciseness in exposition and consistency in treatment are two of the book's most prominent features. The sentence construction in places is not as good as it might be, but this occasional weakness is not such as to cause any great difficulty. The photographs are another feature worthy of mention for they are well chosen and usually illustrate the insect, its stages and its destructive work, all of which should aid materially in identification.

The book is of such a nature that few would care to read it through from cover to cover, but it will undoubtedly prove to be an invaluable handy reference work to both entomologist and layman.

R. W. Glaser.
Bussey Institution.

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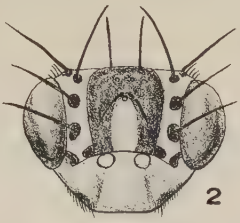
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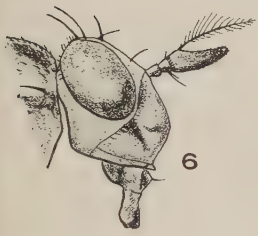
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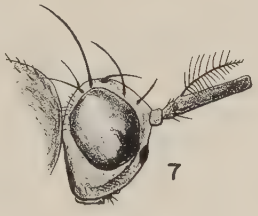
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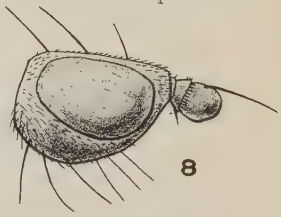
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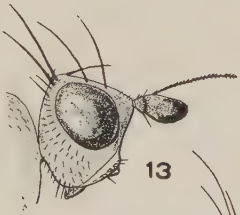
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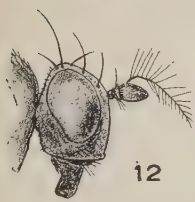
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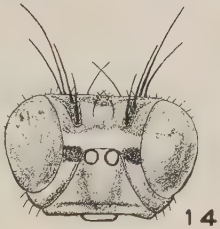
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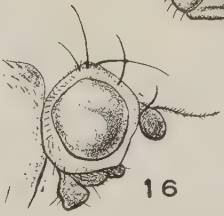
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MELANDER—SAPROMYZIDAE.

THE STANFORD EXPEDITION TO BRAZIL, 1911.

J. C. Branner, *Director.*

NEUROPTEROID INSECTS FROM BRAZIL.

By Nathan Banks
East Falls Church, Va.

Mr. Mann turned over to me a small but very interesting collection for study; some of them were in alcohol, and these cannot always be placed with certainty, so that a few caddice flies remain unnamed.

Several of the species show a relationship with the fauna of western Argentina; but there are hardly enough species for generalizations in this regard.

Psocidæ.

Thrysophorus speciosus Busmeister.

Several examples of this striking species from Porto Velho, Brazil (Mann coll.) known from many parts of South America.

Ischnopteryx cincta Enderlein.

One specimen from Porto Velho, Amazonas, Brazil. Previously known from the Amazon Region.

Psocus albostigmus sp. nov.

Dark brown; antennæ brown on the extreme base, first long joint mostly yellow, its tip and rest of the antennæ nearly black; legs pale yellowish brown; abdomen blackish near tip, very pale yellow on basal part of venter. Wings dark brown, a broad whitish band across near base, and the basal half of the stigma white, rest of stigma nearly black; a pale dot on the forking of the radial sector just behind the stigma, one on the end of the anal vein, and the lower edge of the discal cell hyaline white; veins blackish; hind wings gray, veins darker. Antennæ sparsely hairy, the hairs about twice as long as width of a joint; head with short hairs. Discal cell nearly twice as long as broad at base, base one-half broader than tip, outer side barely concave; stigma nearly angulate behind, the outer side long and sloping. Length 2.7 mm.

From Madeira Mamoré River, Matto Grosso, Brazil (Mann coll.).

Notiopsocus gen. nov.

Related to *Peripsocus* and *Ectopsocus*. Tarsi two-jointed, in fore legs the joints subequal, in the hind legs the basal joint twice as long as the apical joint. Head broad, eyes rather small, ocelli distinct; legs moderately slender. Fore wing with long stigma; median vein near its tip with but one branch, and in some cases this is faint or absent; cubitus simple, not quite reaching the margin; in hind wing the median and radius united for some distance. Type, *N. simplex* sp. nov.

Notiopsocus simplex sp. nov.

Pale yellowish, head and thoracic notum brownish, eyes black, ocelli on black spot; legs wholly pale; wings hyaline; stigma grey, nearly four times as long as broad, with three rows of bristles. Wings hardly reach to tip of abdomen, dorsum of abdomen very soft, venter more chitinous and brown, and two apical rings also more chitinous, the last segment bilobed at tip, and sparsely hairy. Length 1.7 mm.

From Manaos, Amazonas, Brazil (Mann coll.).

EPHEMERIDÆ.

Campsurus dorsalis Burmeister.

A number of specimens of a large species which I identify as this species; I figure the male genitalia; they are similar to those of *C. albifilum* Walk., and perhaps that species is a synonym of *C. dorsalis*. From Camp 41, and 39, Madeira River, Brazil. Described from Brazil. I suspect that *C. pictetii* Kirby is the same species.

Campsurus latipennis Walker.

A few specimens of a small species; I figure the male genitalia which agrees fairly well with the figure of Eaton, the process near base of the long appendage is very slender, the size and marks agree with Eaton's description.

From Camp 41, Madeira River, Brazil. Described from Brazil.

Spaniophelbia assimilis sp. nov.

Head and thorax dark brown; abdomen and legs paler brown; setæ whitish, the basal joint brown, the next short oblique joint almost black; the setæ furnished with many short spine-like hairs, and few very long fine hairs, mostly on the inner side, wings hyaline, veins dark, three radial cross-veins, two medial ones, behind the cubitus is a weak sinuous vein that is connected to cubitus by a cross-vein; by this character it is related to *S. anceps* Eaton, but that species has more cross-veins.

Differs from *S. traili* Eaton in not having the cubitus forked, and unmarked wing. Expanse 16 mm.

From Camp 41, Rio Madeira River, Brazil (Mann.)

Tricorythus australis sp. nov.

Pale yellowish, thoracic notum brown, vertex with a black crescent-shaped mark each side near the eye; pronotum and pleura with some faint blackish spots and sometimes two submedian dark streaks on the mesonotum; abdominal segments blackish on the sides, sometimes all across on the hind margin, the last few segments more broadly marked than the others; legs long and slender, wholly pale; wings moderately broad, subhyaline, subcosta and radius darkened, but few cross-veins and these mostly before the middle of the wing. Setæ three, the laterals rather larger than the median, especially in male. Expanse 8 mm.

From Camp 41, Rio Madeira, Brazil (Mann.)

Bœtis oldendorffi Weyenbergh.

Three specimens agree with the figure of the fore wing given by Weyenbergh, but that author evidently overlooked the hind wings which are very slender and inconspicuous.

From Camp 41, Rio Madeira River, Brazil (Mann coll.).

PERLIDÆ.

Neoperla debilis Pictet.

One from Madeira Mamoré River, Matto Grosso, Brazil (Mann). Described from Brazil.

Neoperla posticata sp. nov.

Head yellow, with black mark extending forward from between the ocelli, and then bending at right angles to the eyes; antennæ dark; pronotum dark brown, with a broad pale median stripe, widened in front; thorax and abdomen pale yellow; setæ dark brown except the basal joint which is yellow; legs blackish, but basal half of fore and middle femora, basal two-thirds of hind femora, and a broad band beyond middle on hind tibiæ, bright yellowish; wings a uniform brown, except the yellowish costal margin. Ocelli about two diameters apart and but little farther from the eyes, lateral bosses close to the ocelli, and about their diameter from the eyes; pronotum much broader than long, slightly narrowed behind, sides strongly rugose; hind tibia longer than hind femur, very broad. Fore wings with two branches to the radial sector; three median and three cubital cross-veins, alternat-

ing. In hind wings also two branches of radial sector, and four cubital cross-veins; in both wings two cross-veins beyond end of the subcosta. Expanse 19 mm.

From Rio Madeira, Abuná, Brazil (Mann coll.).

NEUROPTERA.

Sialidæ.

Corydalis nubila Erichson.

Two specimens of this species, of small size, from Porto Velho, Rio Madeira River, Brazil (Mann and Baker).

Common in parts of Northern South America.

Chrysopidæ.

Chrysopa lanata Banks.

Several from Natal, and Pirangi, Brazil.

Previously known from Argentina.

Chrysopa hybrida Burmeister.

One from Manaos, Amazonas, Brazil (Mann coll.).

Described from Brazil.

Chrysopa sp.

One from Marangape Mts. Ceará, Brazil (Mann coll.). Appears to be new, but is not in good condition; the antennæ beyond base are black, the basal joint with stripe above, pronotum red on side margins, most of cross-veins and the gradate veins black, the inner gradate series much nearer to the outer than to the radial sector.

Myrmeleonidæ.

Dimarella efferus Walker.

Three specimens from Abuná, Rio Madeira, Brazil (Mann coll.).

Described from Brazil.

TRICHOPTERA.

Odontoceridæ.

Marilia fasiculata sp. nov.

♂—Spurs, 2–4–2. Dark brown; eyes nearly meeting above, basal joint of antennæ large, slightly swollen in the middle, antennæ whitish, but the joints

broadly banded with black; palpi nearly black, tips of the joints whitish; legs pale brownish, tarsal joints marked with dark brown. Abdomen yellowish brown, the penultimate ventral segment with a black spot; fore-wings nearly uniform brownish, but the stigmal region darker, and outer margin rather darker; hind wings grey with darker veins; at anal angle is a spreading fascicle of long hairs, nearly as long as width of fore wings. Fore wings slender, outer margin nearly truncate, discal cell longer than pedicel, the first apical not so far back on the cell as in *M. minor*; the median vein does not reach outer margin; fork five does not reach as far back as fork one; the hind wings are broad, the anal portion twice as broad as the other part; venation similar to *M. minor*. The male appendages are long, similar to *M. minor*, but the tip enlarged, and a pair of upcurved lateral pieces within the larger appendages. Expanse 19 mm.

From Madeira Mamoré River, Matto Grosso, Brazil (Mann coll.).

MACRONEMATIDÆ.

Leptonema crassum Ulmer.

Camp 43, Madeira Mamoré River, Brazil (Mann and Baker coll.) and Manaos, Amazonas, Brazil (Mann coll.). Known from Brazil, Ecuador, Colombia, and Central America.

Leptonema externum sp. nov.

Pale yellowish white, a dark cloud near the stigma, two black dots near costal base of fore wings and a black dot on outer base of basal joint of each antenna, rest of antennæ faintly annulate; vertex tuberculate near base of antennæ, clothed with fine short hair; third joint of maxillary palpi rather more than one-half the length of the second, much swollen below, fourth joint about one-half as long as third. Wings of moderate length, median cell very broad, fifth apical some distance back on the median cell, discal rather longer than broad. Expanse 25 to 30 mm.

From Camp 41, 360 Kilometers from Porto Velho, Brazil (Mann coll.).

LEPTOCERIDÆ.

Leptocella jenseni Ulmer.

One from Camp 43 Madeira Mamoré River, Brazil (Mann coll.). Although much rubbed it seeems to agree with cotypes of this species from Argentine.

Œcetina sp.

One specimen, with the anastomosis strongly marked; not *Œ. excisa*, for fork one is quite long pedicellate.

From Manaos, Amazonas, Brazil (Mann coll.).

Hydropsychidæ.

Rhyacophylax lobatus Ulmer.

Many specimens from Manaos, Amazonas; Camp 41, 360 Kilometers from Porto Velho; and Madeira Mamoré River, Matto Grosso, Brazil. (Mann coll.). Previously known from Argentine.

Ecnomodes buchwaldi Ulmer.

Four from Manaos, Amazonas; and Camp 43, Madeira Mamoré River, Matto Grosso, Brazil (Mann coll.). Previously known from Peru; a very distinct and handsome little species.

Cyrnellus gen. nōv.

Differs from *Cyrnus* in having median cell of fore-wings open, and the subcosta runs into radius, or connected obliquely thereto. Type *C. minimus* Bks.

Includes also *Cyrnus risi* Ulmer.

Cyrnellus minimus sp. nov.

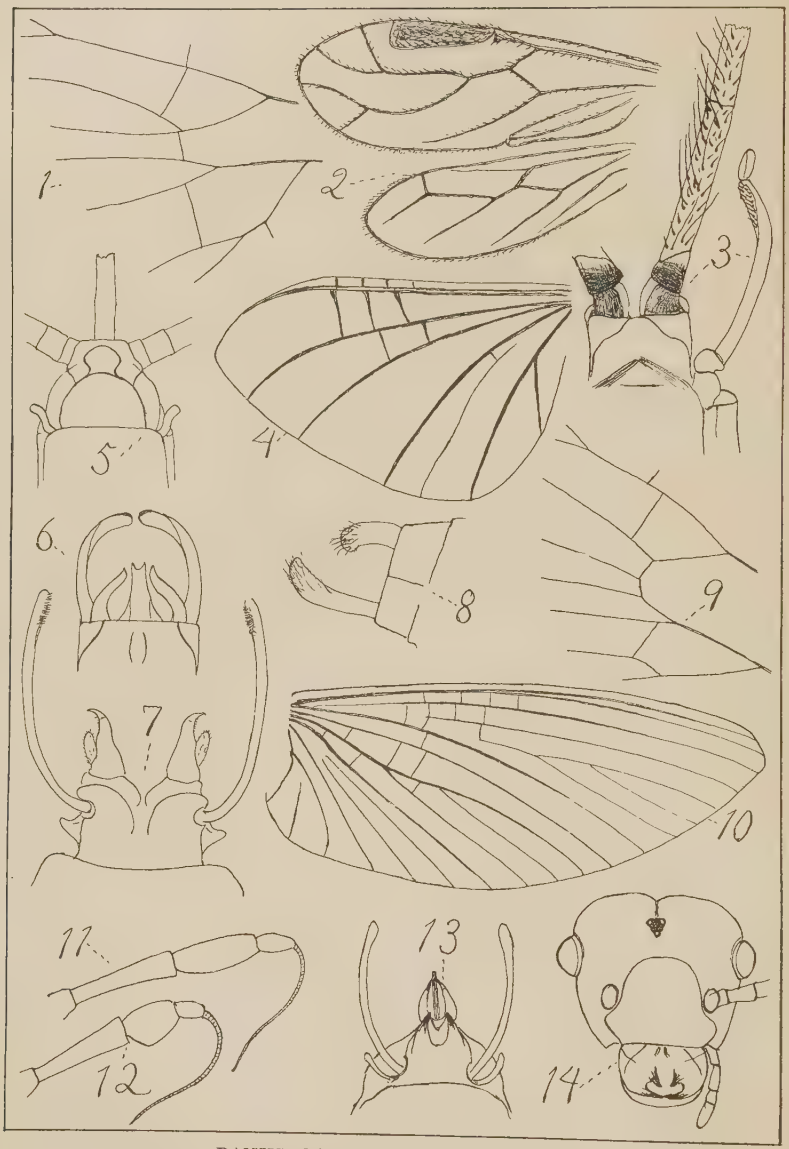
Agrees with *C. risi* in venation, length of cells and forks of both wings. However the wings are of a uniform brown, not darker around outer edge; the lower appendages of the male are not as heavy as in *C. risi* when seen from the side, and the insect is smaller (fore wings hardly 4 mm. long); only apical half of antennæ strongly serrate; the wings are rubbed, but show some scattered golden hairs.

From Camp 41, 360 Kilometers from Porto Velho, Brazil, and Madeira Mamoré River, Matto Grosso, Brazil (Mann coll.).

Appendix.

As an appendix I give a table of the species of *Leptonema* known to me; two others are described, one, *L. speciosum* Burm. from Brazil has dark marks on the wings but not near as heavily marked as *L. cinctum*, the other from Southern Brazil, *L. sparsum* Ulmer, has a peculiarity in the venation. I describe one new species from Guatemala, and have yet one other species which appears to be new.

1. Wings with dark streaks all over, leaving hyaline spots ..... *cinctum.*
   Wings nearly uniform, or darker only near the stigma 2
2. Two or three black dots near costal base of fore wings 3
   No such dots 5



BANKS—NEUROPTEROID INSECTS.

3. A black spot at base of outer side of each antenna; wings whitish....*externum.*
   No such spot at base of antenna....4
4. Wings brownish, often darker on costal part near stigma, third palpal joint not twice as long as fourth....*crassum.*
   Wings whitish; palpi more slender, the third joint about twice as long as the fourth....*columbianum.*
5. Wings white or greenish white....*albovirens.*
   Wings more or less brownish....6
6. Fifth apical cell of fore wing reaches well on the median cell....8
   Fifth apical cell reaches only to the median cell....7
7. Discal cell long; dots distinct and black....*stigmosum.*
   Discal cell hardly longer than broad, dots obsolete....*agraphum.*
8. Discal cell hardly longer than broad, outer side very oblique....*pallidum.*
   Discal cell but little longer than broad, outer side vertical; second palpal joint not one and a half times as long as third....*guatemalum.*
   Discal cell nearly twice as long as broad; wings long and slender; second palpal joint more than one and a half times as long as the third....*furcatum.*

Leptonema guatemalum sp. nov.

Pale yellowish brown, about as in *L. pallidum*; antennæ plainly annulate with brown; vertex flat, with only short hairs; maxillary palpi slender, the second joint hardly one and a half times as long as the third, which is longer than usual, but not much swollen, the fourth not one-half the length of the third. Wings of moderate length, pale yellowish brown, the costal margin not darker, discal cell longer than in *L. pallidum* and the outer margin vertical, fifth apical a short distance on median cell, median cell not very broad. Expanse 30 mm.

From Olas de Moka, Dept. Solola, Guatemala, Sept. (Englehart coll.).

Explanation of Plate.

Figure 1. *Leptonema externum* wing cells.
2. *Notiopsocus simplex* wings.
3. *Spaniophlebia assimilis*, genitalia.
4. *Spaniophlebia assimilis*, fore wing.
5. *Tricorythus australis*, genitalia.
6. *Marilia fasiculata*, genitalia.
7. *Campsurus dorsalis*, genitalia.
8. *Cyrnellus minimus*, genitalia.
9. *Leptonema guatemalum*, wing cells.
10. *Tricorythus australis*, genitalia.
11. *Leptonema guatemalum*, palpus.
12. *Leptonema externum*, palpus.
13. *Campsurus latipennis*, genitalia.
14. *Notiopsocus simplex*, head.

A NEW SPECIES OF PHORIDÆ FROM NEW ENGLAND.

By Charles T. Brues.
Bussey Institution, Harvard University.

In a small collection of New England Phoridæ recently given to me for identification by Mr. C. W. Johnson, I have found one large and conspicuous species of the genus Chætoneurophora[1] which appears to be undescribed.

Chætoneurophora aureiventris sp. nov.

Length 5 mm. Head and thorax black, abdomen reddish orange, legs honey yellow, wings tinged with brown. Head small, its bristles very large and stout; front less than twice as broad as high, its surface grayish pollinose, with an impressed median line extending from the anterior margin to near the antennal tubercle and widening out above into a depression which fills out the space between the median bristles of the sub-ocellar row, and extends above the antennæ as a fine, impressed line; supra-antennal pair of bristles reclinate, stout, approximate at base; row above of four nearly equidistant bristles forming an arcuate line curved down medially; sub-ocellar row of four equidistant bristles in a straight line, the lateral ones very near the eye margin. Antennæ oval, moderately large, orange-red, with subdorsal piceous, pubescent arista as long as the width of the head. Post-ocular cilia very large and stout, strongest just above the middle of the eye; cheeks each with a very long macrochæta at lower angle and a bunch of several short bristles above next to the insertion of the antenna. Palpi orange-red, of ordinary size, beset below with very short bristles with several long ones in addition near apex. Mesonotum and scutellum black, the humeral angles fuscous; one pair of dorsocentral macrochætæ and four equally stout scutellar bristles; scutellum transverse, nearly twice as broad as long. Pleuræ piceous, lighter below, the propleura fuscous, with a tuft of bristles above the coxa, and elsewhere sparsely clothed with short bristly hairs, several of which at the upper angle are decidedly larger. Mesopleura not bristly. Abdomen reddish orange, the segments subequal, except the sixth which is much elongated. External genitalia piceous, and first segment infuscated above except near the middle; second segment with a tuft of small black bristles on each side, slightly elongated, but not very strongly so. Sides and venter of abdomen entirely orange-yellow. Pleuræ black or fuscous, the amount of black varying from none to nearly the entire pleura. Mesopleura not bristly above. Coxæ and legs brownish yellow or testaceous, hind femora slender, none of the tarsi thickened. Fore tibia with a single bristle at the middle on the outer edge; middle tibia with three bristles, one at end of basal fourth on front side, one at end of basal third on outer side and one on front side just before tip,

[1] Malloch, J. R. The Insects of the Dipterous Family Phoridæ in the United States National Museum. Proc. U. S. Nat. Mus., Vol. 43, p. 422, (1912).

in addition to one long terminal spur; hind tibia with three bristles, one at basal third on outer edge, one just before middle on the front side and one just before tip on front side in addition to two apical spurs: in addition the hind tibia is transversely striated on the hind (i. e., inner, as the leg folds next to the body) side near tip. Wings yellowish, the veins yellowish brown: costa not thickened, reaching almost two-thirds the length of the wing, its bristles very short and dense; third vein very finely bristly as far as the fork; first vein ending midway between the humeral cross-vein and the tip of the third; second vein lying very close to the third, from which it emerges at a very slight angle; fourth vein curved strongly at base but straight beyond and faintly recurved at apex, ending at the wing tip; fifth and sixth slightly sinuous; seventh distinct. Halteres clear yellow.

Described from three females sent to me for identification by Mr. C. W. Johnson. Type from Kingston, R. I., May 7, 1905. Paratypes: Riverside, Mass., May 20, 1905; Hampton, N. H., May 16, 1905 (S. A. Shaw). Type in the collection of the Boston Society of Natural History.

This species resembles *C. variabilis* Brues from Colorado and Washington more closely than any other described species and may possibly be only a well-marked form of *variabilis*. However, the halteres are pale, there is much more of the orange color on the abdomen, and there are only two supra-antennal bristles. From *C. thoracica* it differs by the non-thickened costa and from other related species in the chætotaxy of the tibiæ.

MUSCOID PARASITES OF THE COTTON-STAINER AND OTHER LYGÆIDS.

By Charles H. T. Townsend.
Lima, Peru.

The only muscoid parasites of *Lygæidæ* so far known in any stage have come to light in Sicily and Peru. The number of species has now reached four, one of which has been reared to the adult. The finding of these may be taken in chronologic order.

1) Neilsen mentions finding what was probably a muscoid maggot (Snyltefluеart) in the abdomen of an adult of *Lygæus saxatilis* Scop. in Sicily. The fly was not reared. The species may have been a *Clytiomyia* (recorded from Sardinia), *Eliozeta*, or *Elomya* (*Ananta*), less likely a *Xysta*, *Cistogaster*, or *Besseria*.

2) The next finding of muscoid maggots in Lygæids was by

the writer at Piura, Peru. Three maggots were found in adults of *Stenomacra* sp. near *limbatipennis* Stal, July 27 (one in 3rd stage), and July 28 (one in 2nd, and one in 1st stage), 1911. In each case one maggot occurred alone in the abdomen of the host. On August 19, 1911, a dried puparium of the same species was found in the contents of a box in which adults of this host had been placed on August 1. The fly was not reared. The species is almost certainly *Xanthomelanodes peruanus* Towns., which is very abundant in the Piura valley, as is likewise the host.

Anal stigmata of third-stage maggot and puparium—The anal stigmatal plates are rather narrowed, not as broad as long, closely approximated, well raised as on a short process; the three slits are ridge-like, disposed at about 22½° angle to the long (dorso-ventral) axis of the plates, rather elongate, sharp, well raised.

3) On February 3, 1911, the writer collected 817 adults of *Dysdercus ruficollis* Linné on cotton in the Chira valley between Sojo and Macacará, picking and putting in with them at the time some opened cotton bolls and keeping them alive in a fine-screened wooden cage as long as they would live on mashed moistened cottonseed, in the hope of securing parasites. This species is the common cotton-stainer of the Peruvian coast region. No sign of muscoid parasitization was obtained from the lot other than the finding on February 10 of a small muscoid puparium in the lint of one of the opened cotton bolls that had been put in the cage February 4. This puparium had transformed from a maggot that had evidently escaped from a stainer to the lint of the opened boll before collection. The puparium proved to be parasitized, a *Perilampus* sp. issuing from it on March 2, 1911. Mr. H. S. Smith's recent investigation of the planidium stage of *Perilampus* shows that it enters the muscoid maggot while the latter is still *in situ* within the body of its host. This explains the finding of the present parasitized puparium within a cage which the adult of *Perilampus* could not have entered. The hyperparasite was determined by Mr. J. C. Crawford. The puparium was probably that of *Acaulona peruviana* n. sp. It was sent in with the reared hyperparasite.

My assistant, Mr. E. W. Rust, had better success in rearing the fly in 1912. From 594 adults of *D. ruficollis* collected at various dates during the last week of September and the first week of Octo-

ber at San Jacinto in the Chira valley, a little below Macacará, there issued on October 29, 1912, two flies, a male and a female, of *Acaulona peruviana* n. sp.

Acaulona peruviana sp. nov.

Length of body, about 7 mm.; of wing, about 6 mm. Light yellow to tawny yellow and deep golden. Face including parafacials silvery, with a golden sheen; that of male hardly more golden than that of female. Parafrontals deep gold in both sexes, frontalia dark brown to blackish. Antennæ and palpi yellowish, former tinged with brownish on front edge. Occiput golden. Thoracic scutum broadly deep gold on borders and transverse suture, leaving the four broad subcoalescent vittæ in two patches of blackish before and behind suture; the parts of vittæ in front of suture more distinctly defined, especially in the male, of which the outer are shorter and broader, and well separated from the inner. Scutellum of female dusky, narrowly yellowish on tip; that of male more yellowish, basal half or less dusky. Pleuræ and coxæ silvery, with golden tinge. Abdomen of female rather tawny yellowish to gold, that of male bright light yellow in a well-defined elongate area on each side; irregular soft brownish median fascia, its sections widening posteriorly on hind margin of each segment, usually more conspicuously so in female; last two segments (5 and 6) of female and last segment (6) of male wholly yellowish; fifth segment of male largely dusky. Abdomen of male narrowed and flattened, elongate; that of female widened, swelling on sides, arched. No true abdominal macrochætæ, but the hairs of male in some cases simulate them. Femora largely yellow, the front ones least so and quite blackish above, the hind ones dusky only on tip; rest of legs blackish. Tegulæ yellow to golden, especially on disc. Wings blackish on less than costal one-half, abruptly subhyaline on rest; apical cell clear except sometimes on front margin and tip, closed in margin.

This species seems more closely related to *A. tehuantepeca* Towns. than to *A. costata* v.d.W.

Described from two reared specimens, male and female, San Jacinto, Chira valley, Piura department, Peru, issued October 29, 1912. These types will be deposited in the U. S. N. M. The species is comparatively rare, only five specimens having been collected by the writer in Peru during three years, these being four females and one male as follows:—One female, Somate, Rio Chira, November 18, 1910, on flowers of *Telanthera* sp.; one male on foliage, Chapairá, Rio Piura valley, May 21, 1911; two females, Cañada de Samán, Chira valley, February 14, 1912, on flowers of *Philibertella flava;* and one small female (about 5 mm.), Sullana, Chira valley, February 17, 1912, on foliage.

This species will be difficult to distinguish from *Xanthomelanodes peruanus* until one becomes familiar with the generic and specific

characters of the two forms. *X. peruanus* has short but pronounced abdominal macrochætæ, abdomen subcylindrical in male and nearly same but shorter in female, the black of wings graduates into the subhyaline, the femora are blackish, the face golden especially in male, the abdominal triangles are shining blackish to black, the tegulæ are pale yellowish to whitish, the scutellum wholly black and thoracic vittæ more clearly defined. *Acaulona* shows the distinctive facies of the *Trichopodiæ* in the male sex, and rather that of the *Polistomyiiæ* in the female sex, only lacking the cilia of hind tibiæ.

Puparium—Rather short-stout in form, swollen. The anal stigmatal plates are broad, contiguous, closely approximated, each nearly as broad as long, not raised; the three slits are ridge-like and obliquely disposed, being at about 45° angle to both axes of the plates, rather short and sharply linear, a very little raised, their bases swelling.

(4) From the same lot of 594 adults of *D. ruficollis* there was also found issued October 29, 1912, with the above two specimens of *A. peruviana*, a third puparium still containing the fly and supposed by Mr. Rust to belong to the same species. It proves to be an entirely distinct genus from both *Acaulona* and *Xanthomelanodes*. The fly has not issued, and the contents are probably dried. The anal stigmata are well produced and prominent, approximated, and the three slits or divisions of each are swollen tuberculate instead of linear ridge-like.

Puparium—Length about 6 mm., being about the length of the *Acaulona* puparium but not so swollen. Anal stigmatal plates produced into a rather high process, height about equal to long axis of plate or dorsoventral diameter, each plate rather narrowed, the two approximated but not actually contiguous; the three slits appear tuberculate by reason of their greatly swollen bases, each plate presenting the appearance of three rounded divisions, the axis of slits at about 45° angle to both axes of plates, the slits themselves apparently irregularly compressed-sinuate.

THE GENUS PHRYGANEA (TRICHOPTERA) IN THE FLORISSANT SHALES.

By T. D. A. Cockerell.
The University of Colorado.

If it receives anything like the treatment it deserves, Ulmer's magnificent work, *Die Trichoptera des Baltischen Bernsteins*, will create much new interest, not only in the Trichoptera of amber, but in the general history and classification of the group. Among other things, it shows that as far back as the oligocene in Europe the genus *Phryganea* was very well represented, no less than seven species having been discovered in amber. When we consider that only 20 or 21 recent species are known in the world, it appears probable that in mid-tertiary times it was considerably richer in forms than at present; but the modern *Neuronia*, with quite numerous species, may be taken to represent an offshoot from the *Phryganea* of the tertiaries, some of the fossil species possessing more or less evident *Neuronia*-like characters.

In the Miocene shales of Florissant Colorado, *Phryganea* is represented, so far as at present known, by two species. One of these was long ago described by Scudder; the other is new. In addition, Scudder described a *Neuronia evanescens*, but its reference to *Neuronia* is doubtful. No definite idea of its venation can be gained from Scudder's figure, but his description is more explicit. Vein R_2 leaves the discoidal cell "close to the base," a condition approached by the amber species *Phryganea longirostris* Hagen. On the other hand the discoidal cell is comparatively short, as is usual in *Neuronia*, while the R–M cross vein is "widely separated" from the end of the discoidal cell, that is, considerably beyond it; an approach to the latter condition is shown by the amber species *P. egregia* Ulmer and *P. picea* Pictet. An exact drawing of the venation of *N. evanescens*, based on Scudder's type, is much to be desired.

Phryganea labefacta Scudder.

I have before me a very well preserved anterior wing, collected by my wife at Station 17. It is $19\frac{1}{4}$ mm. long, and a little over $7\frac{1}{2}$ broad; the discoidal cell is $6\frac{1}{3}$ mm. long; end of discoidal cell

to apex of wing 7 mm.; length of cellula thyridii 7 mm. In some ways, this species is suggestive of *Neuronia*. Scudder's figure shows a distinct mottling, suggestive of *N. pardalis* Walker, but the apex of the wing is much blunter than in *pardalis*. In shape, the wing is more like that of *N. ruficrus*, but the apical part of the costa is not so rounded as in that insect, and the anal angle is rather more distinct. The wing-form of *P. labefacta* is not unlike that of the amber *P. longirostris* Hagen, but our insect has the costa much straighter, the anal angle more distinct, and the wing hardly so broad in proportion to its length. The comparatively distinct anal angle is as in the amber *P. singularis* Ulmer.

Phryganea miocenica sp. nov.

A very fine species, collected by one of the University of Colorado expeditions, but the collector and station are not recorded. It is represented by an upper wing, very well preserved except for the loss of a considerable part of the region of the anal angle. It appears to represent a female, and is a quite typical *Phryganea*, with relatively long wings.

Upper wing about 24 mm. long, 9 wide, as preserved red-brown, the costal region broadly darkened, the anal region dusky, the veins dark on a lighter ground. Owing to the dark costal cell, the oblique cross-vein between the costa and subcosta cannot be clearly demonstrated, but a kink in the subcosta indicates its point of origin. The discoidal cell is about 7⅛ mm. long; cellula thyridii 9 mm.; apex of wing to base of discoidal cell slightly over 16 mm.

Compared with the female of the amber *P. latissima* Ulmer, there is close agreement in venation, though our insect is much longer-winged than *latissima*, yet not so long (narrow) winged as *P. dubia*. Compared with *P. latissima*, the second anal cell of *P. miocenica* is longer and narrower, its lower side more convex; the cellula thyridii is longer and narrower; the apical angle of the discoidal cell is much more acute. The lower branch of the media forks is in ♀ *latissima;* owing to the loss of part of the wing, only the extreme base of the fork is visible.

This is the largest of the Florissant Trichoptera, and is considerably larger than any of the amber species of *Phryganea*.